

PROCEEDINGS

OF THE

ROYAL SOCIETY OF EDINBURGH.

1840.

No. 17.

Monday, 17th February 1840.

Dr HOPE, V. P. in the Chair.

The following Candidates were elected Fellows of the Society:—

John Cockburn, Esq.

Sir William Scott, Bart.

Rev. C. H. Terrot.

The following Donations were presented:—

Comptes Rendus Hebdomadaires des Séances de l'Académie des Sciences, 1839. 2^d Semestre, Nos. 23, 24, 25, 26, and 27.

1840. 1^{er} Semestre, Nos. 1, 2, 3.—*By the Academy.*

Quarterly Journal of the Statistical Society of London. Vol. ii.

Part 6. January 1840.—*By the Society.*

Bulletin de la Société de Géographie. 2^{me} Series. Tome xi.—

By the Society.

Flora Batava. Part 118.—*By the King of Holland.*

The following Communications were read:—

1. On the Cosmogony described in the Sixth Eclogue of Virgil, and on its relation to the theories of Modern Geology.
By the Venerable Archdeacon Williams.

41. 4. 3. 6.

2. A brief notice relative to an Aërolite which was seen to fall near Juvinas, in the Department of the Ardèche in France, on the 15th June 1821. By Professor Forbes.

"When visiting the ancient volanoes of the Haut Vivarais, the author was led to make some inquiries relative to the fall of this remarkable meteor, which took place in broad day-light, almost in the midst of the scattered hamlet of Libounez, near Juvinas, and which was witnessed by many persons, some of whom still survive, and gave the account which the author presented.

"The stone fell on the 15th June 1821, at 4½ P. M.; sky clear, and wind north. A long roll was heard, then an explosion like that of a cannon, five minutes before the stone fell. It touched the ground within a few feet of several men who were digging potatoes within a small enclosure. It perforated a *vertical* hole five and a half feet deep, and burnt the ground to a cindery state, no light having accompanied the noise or the fall. The stone had wedged itself between two others, and could not be removed without breaking it. It weighed 220 pounds.

"A specimen was exhibited, intended to be placed in the University Museum."

Monday, 2d March.

Sir T. M. BRISBANE, Bart., G. C. B., Pres., in the Chair.

The following Candidates were elected Fellows of the Society :—

Rev. R. Traill.

Mr R. Bryson.

Edward J. Jackson, Esq.

The following Donations were presented :—

Transactions of the Geological Society of London. Second Series. Vol. iv. Part 2; and Vol. v. Part. 2.—*By the Society.*

Comptes Rendus Hebdomadaires des Séances de l'Académie des Sciences. 1840. 1^{er} Semestre. Nos. 4, 5.—*By the Academy.*

Transactions of the American Philosophical Society held at Philadelphia for promoting Useful Knowledge. Vol. vi., New Series, Part 3.—*By the Society.*

Proceedings of the American Philosophical Society. No. 8.—*By the Society.*

Journal of the Society of Bengal for April and May 1839.—*By the Society.*

Philosophical Transactions of the Royal Society of London for the year 1839. Parts 1, 2.

Proceedings of the Royal Society of London. Nos. 37, 38, 39, 40. *By the Society.*

Voyage dans la Russie Méridionale et la Crimée, par M. de Demidoff (Partie Scientifique). Livs. 3 and 4 en 8vo, et Planches en fol.—*By the Author.*

The Journal of the Royal Geographical Society of London. Vol. ix. Part 3.—*By the Society.*

Ordnance Survey of the County Mayo in Ireland, in 125 sheets.—*By His Excellency the Lord Lieutenant of Ireland.*

The Quarterly Journal of Agriculture; and the Prize Essays and Transactions of the Highland and Agricultural Society of Scotland. No. 48, for March 1840.—*By the Society.*

The following Communications were read :—

1. On the Persian mode of making Malleable Iron direct from the Ore, by James Robertson, Esq. Communicated by Robert Bald, Esq.
2. On the Fatal Effects of Air drawn into the Veins during Surgical Operations on the Neck and Shoulder. By Sir Charles Bell, K. H.

“ The author referred in this paper to the experience of Baron Larrey; also to operations performed by Baron Dupuytren and M. Roux, who, in removing the arm at the shoulder-joint, heard the air drawn in, and witnessed the effect in the instant death of their patients.

“ He noticed the experiments made by the *Academie Royal de Medicine*, and conceived that they regarded too exclusively the influence of the heart and lungs. He explained the phenomenon to be owing to the elevation of the muscles of the neck, by which the atmospheric pressure was taken off, and the air drawn into the open vein.

“ Observing that the alternate elevation and depression of the muscles of the neck attended every act of breathing, he drew attention to the circumstance of the entrance of the thoracic duct into the veins of the neck, whereby it was subjected to the alternation of suction and compression. Noticing at the same time that, in classes of animals which did not breathe with apparatus similar to man, the trunk of the absorbent system entered into other veins, and had a substitute for the alternate action of the muscles of the neck.

"He observed that, granting an action of inhaling by the lungs or the auricle of the heart, it would not explain the fact of air entering by the veins, since these vessels, having their sides delicate and pliant, would be sucked together and collapse.

"He further remarked, on the deadly effect of the air thus entering the circulating system, that it did not satisfy the inquirer to say that death was produced by impeding the circulation in the heart, or the oxygenation of the blood in the lungs; that we must keep steadily before us the fact that death took place suddenly, without a struggle or a groan, or one expression of anguish in voice or feature,—a transition suddenly, and without interval from life to death.

"Contemplating the phenomenon thus, there was but one organ or point which, being disordered, could at once terminate sense and motion, and voice and expression, viz. the *medulla oblongata*; and he therefore concluded that the air entering the vertebral arteries deprived this vital part of arterial blood; cutting off the source of all living power and causing death."

Monday, 16th March.

Right Hon. Lord GREENOCK, V. P. in the Chair.

The following Candidates were elected Fellows of the Society :—

John Shedden Patrick, Esq.

John Learmonth, Esq.

The following Communications were read :—

1. On Sulphuret of Cadmium, a New Mineral (first observed by Lord Greenock). By Arthur Connell, Esq.

"This mineral occurs in small crystals embedded in prehnite, at Bishoptown, in Renfrewshire. It had been long supposed to be a variety of zinc-blende; but was first distinguished from that mineral by Lord Greenock. Two small crystals of it, sent to the author for chemical examination by Professor Jameson, appeared to be six-sided pyramids, and had a wine-yellow colour, conchoidal fracture, splendid and vitreous lustre, hardness about that of calcareous spar, orange-red streak, and considerable transparency.

"When heated, it decrepitates, and acquires a fine carmine-red colour, and recovers its yellow colour on cooling. It does not fuse nor volatilize at a red heat.

"In powder it is readily soluble in heated muriatic acid, with

strong smell of sulphuretted hydrogen ; and the solution by evaporation affords a crystallized salt, not deliquescent in an ordinary atmosphere. Carbonate of soda causes in the solution a white precipitate, dissolved on adding ammonia. The precipitates by potash and by carbonate of ammonia are not dissolved in whole or in part by excess of the precipitants. Sulphuretted hydrogen throws down from the solution with excess of acid, a copious yellow precipitate ; and after neutralizing by ammonia, during which operation a few flocks of sulphuret of iron fall, a renewal of the current of sulphuretted hydrogen causes no farther precipitation. Oxalate of ammonia, phosphate of soda, and prussiate of potash, cause white precipitates ; and sulphuric acid does not occasion any at all. A piece of zinc throws down reduced metal as a grey ramification. These various reactions sufficiently prove that the mineral under examination is sulphuret of cadmium ; and that it contains no zinc, and only a trace of iron.

“ The author having obtained a larger crystal, of a reddish-yellow colour, and of similar crystalline form, from Lord Greenock, found its specific gravity to be 4.842 at 60° F. An analysis was also effected on 3.71 grains, principally of this crystal, by decomposing it by fuming nitric acid ; precipitating the sulphur in the state of sulphuric acid by muriate of barytes ; and throwing down the excess of barytes by sulphuric acid, and the cadmium as a carbonate by carbonate of ammonia, and converting it into the oxide by ignition. The constituents were thus found to be :

Sulphur,	.	.	22.56
Cadmium,	.	.	77.30
Iron, traces.			

99.86

Agreeing completely with the theoretical composition of

1 Atom sulphur,	.	201.16	22.40
1 Atom cadmium,	.	696.76	76.59
		897.92	99.99

The mineral is thus a protosulphuret of cadmium, and is the first instance of a *separate* ore of cadmium, so far as the author knows.

“ It is readily distinguished from transparent yellow zinc-blende, which it resembles, by its orange streak, that of yellow zinc-blende being white, and by its yielding with soda before the blow-pipe a copious yellowish-red ring of sublimated cadmium, with no white sublimate. With borax it gives a yellow gloss.

“ The specific name of Greenockite has been given to it by Professor Jameson, in honour of Lord Greenock.”

2. On an Optical Illusion giving the idea of an Inversion of Perspective in viewing objects through a Telescope. By Professor Forbes.

" It has been noticed as a curious fact, first, it is believed, by Mr Whitwell, that *all* parallelograms seen obliquely appear distorted when magnified by a telescope. The effect is to render the space between the upper and lower parallel lines apparently greater as the distance increases,—thus annihilating the usual convergence to a vanishing point, or even reproducing it in an opposite direction. It is hardly necessary to add, that this Inversion of common perspective is only apparent; a fact conclusively established by measuring the angles subtended by the two extremities of a signboard or a row of windows, when the angle evidently diminishes with distance.

" The effect of magnifying power in apparently distorting objects, may, on the author's view of the subject, be thus concisely stated. The vanishing point of horizontal lines drawn in the same plane is determined wholly irrespective of the distance between them, or the size of the object to be represented. Farther, no movement of the plane nearer to, or farther from, the spectator, produces any variation in the position of the vanishing point in the perspective projection. But a telescope which magnifies an object, a signboard, for instance, magnifies the distance of the vanishing point from the point of sight in the same proportion. Hence the perspective is not true for the plane in which the object actually lies; and if the eye has taken cognizance of the position of the plane by previous inspection, it is easy to shew that it must infer the lines not to be *parallel*, but *diverging* from the nearer to the farther part of the parallelogram. On the other hand, if the plane of the object be not previously ascertained, it may appear still to be a parallelogram, but situated in a plane more nearly perpendicular to the line joining the observer's eye and the object than the true plane. Both these effects are really observed."

3. The following African Shells, collected by J. O. M^r William, Esq., Surgeon R. N., were presented by that gentleman, to the Royal Society, through Dr Traill, who made a few remarks on each, especially the rarest, Nos. 3, 4, 5, 7, and 11.

1. *Achatina Perdix*—Accra, Gold Coast.
2. *Achatina Scabra*—Isle of Princes.
3. *Achatina Reversa Purpurea*—Isle of Princes.

4. *Helix Polyzonalis*—Madagascar ?
5. *Helix* ?—Allied to *H. Ungulina* and *H. Oculus*.
6. *Lymnæa Columna*—Isle of Princes.
7. *Ampullaria Corrugata*—Madagascar.
8. *Trochus Turbinatus*—Isle of Princes.
9. *Nerita Atrata*— Do.
10. *Neritina Puligera*— Do.
11. *Neritina Corona*—Mozambique.
12. *Turbo Muricatus*—Isle of Princes.
13. *Cypræa Moneta*—Africa.
14. *Patella Lacustris*—Kafferland.
15. *Patella Longicosta*—Simon's Bay, Cape of Good Hope.
16. *Patella Monopis*— Do.
17. *Patella Granatina*— Do.
18. *Crepidula Porcellana*—Cape of Good Hope.
19. *Voluta Volvacea*—Africa.
20. A small *Echinus*— Do.

4. There was also presented by Professor Forbes, on the part of R. S. G. Kilbee, Esq., a collection of Fossil Shells, from the great deposit near Uddevalla, in Sweden.

This bed lies from 200 to 300 feet above the level of the sea, an arm of which extends to that town, but no shells are to be found upon its shores. It covers a space of several square miles, and is coated with soil, which in many places has been removed, the shells being taken to mend the roads, as well as for building purposes, and for manure. Such openings upon the surface are frequent on the hill just above the town, on the road to Gottenburg; but a mile or two on that to Wenersburg, and to the left, there is a large vertical opening, exposing to view from thirty to forty feet of the bed's depth, its entire depth being as yet unknown.

The mass of shells may be described as hard packed or pressed together, yet no where consolidated, nothing like order or arrangement being perceptible,—neither lines, veins, bands, nor strata,—alike from top to bottom, no earth, sand, or stones interspersed.

The species *pecten* predominates. Many of the mussels have strange forms; the mass is free, and is easily separated; many shells are already broken into fragments of every size, others delicate and yield to a slight pressure, while others again are fresh and hard, and clink as sharply as recent shells.

One is struck with their disorder; they are in every posture; the bivalves, which are most numerous, being no where in couples, nor horizontal, as when inhabited: a multivalve shell, peculiar to the locality, is in all cases found scattered, its parts being thrown asunder; the delicate sea-urchin, unable to stand the rush, is no where found perfect, though here and there many small portions may be gathered.

In short, the shells are as much confused and involved as if they had been sifted through large meshes; and thus it would appear as if the whole had been at once thrown into its present position by some mighty convulsion which violently overturned and interspersed them.

Monday, 6th April.

Sir T. M. BRISBANE, Bart., G. C. B., Pres., in the Chair.

The following Candidates were elected Fellows of the Society:—

G. A. Stuart, Esq.

Right Hon. T. B. Macauley, M. P.

The following Donations were presented:—

Comptes Rendus Hebdomadaires des Séances de l'Académie des Sciences, 1840. 1^{er} Semestre. Nos. 6, 7, 8, 9.—*By the Academy.*

Astronomische Nachrichten. Nos. 380 to 386.—*By Professor Schumacher.*

Premier Memoire sur les Kaolins ou Argiles à Porcelaine, sur la Nature, le Gisement, l'origine et l'emploi de cette sorte d'Argile. Par M. Alexandre Brongniart, Professeur de Mineralogie au Museum d'Histoire Naturelle.—*By the Author.*

Memoires de l'Academie Royale des Sciences et Belles Lettres de Bruxelles. Tome xii.—*By the Academy.*

Bulletins de l'Academie Royale des Sciences et Belles Lettres de Bruxelles. Tome vi.—*By the Academy.*

Annuaire de l'Academie Royale des Sciences et Belles Lettres de Bruxelles. Sixieme Année. 1840.—*By the Academy.*

Annuaire de l'Observatoire de Bruxelles, pour l'an 1840; par le Directeur A. Quetelet.—*By the Author.*

De la Liberté Physique et Morale; par L. A. Gruyer.—*By the Author.*

Voyage dans la Russie Meridionale et la Crimée; par M. de Demidoff (Partie Scientifique). Livraison 5 en 8vo, et Planches en fol.—*By the Author.*

Nova Acta Physico-Medica Academiae Cesareae Leopoldino-Carolinæ Naturæ Curiosorum. Tome xix. Part 1.—*By the Academy.*

The Dedication of the Sanctuary; a Poem. By James Kennedy Bailie, M. D., M. R. I. A.—*By the Author.*

Observations on the Application of the Catadioptric Zones to Lights of the First Order in the system of Fresnel; with Tables of the Elements of Zones adapted to these Lights. By Alan Stevenson, LL. B., F. R. S. E.—*By the Author.*

The Journal of the Royal Geographical Society of London. Vol. x. Part 1.—*By the Society.*

Collection de Memoires et de Relations sur l'Histoire Ancienne du Canada.—*By the Lit. and Hist. Soc. of Quebec.*

The Quarterly Journal of Agriculture; and the Prize Essays and Transactions of the Highland and Agricultural Society of Scotland. No. 48, for March 1840.—*By the Society.*

The following Communications were read :—

1. Notice regarding the Growth of Plants in close Glazed Cases. By Allan Maconochie, Esq.
2. Results of Additional Experiments on Terrestrial Magnetism. By Professor Forbes.

“ The author commences with some remarks on the degree of accuracy attainable by portable magnetic apparatus, and particularly by the use of dipping needles of moderate dimensions. A six-inch needle by Robinson of London, belonging to the Society, together with the Hansteen apparatus for horizontal intensity, were the chief instruments employed by him in a tour through Germany in 1837, in which (though magnetic investigations did not form his primary object), he endeavoured to obtain the approximate value of the elements of dip and intensity for several important stations, and also to carry out into the Eastern Alps the investigations he had already, in 1832, conducted in Switzerland.

" The following table contains some of the principal results :

Place.	Horizontal Intensity. That at Paris = 1.000.	Dip.	Total Intensity. That at Paris = 1.3482.
Edinburgh, .	.840	71° 55.0	1.409
Greenwich, .	.938	69.11.5	1.375
Brussels, .	.960	68.28.5	1.361
Bonn, .	.979	67.51.3	1.353
Drachenfels, .	.939	...	...
Göttingen, .	.978	67.53.5	1.354
Berlin, .	.973	68. 5.5	1.358
Dresden, .	1.001	...	...
Carlsbad, .	1.020	66.40.7	1.342
Linz, .	1.066	65.15.4	1.327
Ischl, .	1.078	...	...
Salzburg, .	1.073	65. 3.5	1.325
Bad Gastein, .	1.090	...	...
Windisch Matrei,	1.084	...	...
Innsbruck, .	1.077	64.48.7	1.318
Bormio, .	1.087	...	...
Trent, .	1.104	64. 5.5	1.315
Laybach, .	1.127	63.23.6	1.311
Vienna, .	1.080	64.51 0	1.324
Ratisbon, .	1.040	65.52.3	1.325

A collection of Fossil Shells from Italy, presented by the Chevalier Michelotti of Turin, was laid on the table.

A collection of Organic Remains from the Airdrie Coal-measures was exhibited by Mr Bald.

Monday, 20th April.

Sir T. M. BRISBANE, Bart., G. C. B., Pres., in the Chair.

The following Candidates were elected Fellows of the Society :—

Gilbert Laurie Finlay, Esq.

John Mackenzie, Esq.

John Thomson, Esq.

The following Donations were presented :—

Comptes Rendus Hebdomadaires des Séances de l'Académie des Sciences, 1840. 1^{er} Semestre. Nos. 10, 11, 12.—*By the Academy.*

Third Annual Report and Proceedings of the Botanical Society. Session 1838–39.—*By the Society.*

Specimens of Printing Types in the office of Neill & Co., Printers and Type-Founders.—*By Neill & Co.*

A collection of Fossil Organic Remains from Touraine was presented by Sir George Mackenzie, Bart.

Specimens of Fossil Vegetables and Shells from Shetland and Skye, by Professor Necker of Geneva, Hon. F. R. S. Ed.

The following Communications were made :—

1. " Sir Charles Bell requested leave to withdraw his paper *on the fatal effects of air admitted into the veins of the neck during surgical operations*, in order to make additions.

" He stated some interesting facts from veterinary practice. But the principal addition he desired to make was the notice of certain experiments made on the human subject after death, and which Dr Reid repeated and verified.

" A small incision being made in the lower part of the neck, the external jugular vein was found flat ; but an incision being made into it on raising the shoulder and clavicle of that side, the vein opened. On holding open the integuments so that the wound might hold fluid, milk was poured into it : the milk remained stationary as in a cup ; but on elevating the shoulder and clavicle, the milk descended into the vein and disappeared.

" The experiment was repeated and varied, but always to the effect of shewing that, by the elevation of the shoulder and clavicle, and the mastoid muscle attached, pressure was taken off the veins of the neck ; while on the descent of these parts, the fluid sucked into the vein was conveyed downwards.

" These experiments Sir Charles maintained fortified the conclusion to which he had come by process of reasoning in his paper, viz. that air enters the veins of the neck during surgical operations when the veins are opened, and the patient shrinks and inspires deeply."

2. On the Origin and Progress of Grecian Sculpture. By Dr Traill. Part I.

" The author adduced arguments to prove, that the Egyptians were the real masters of the Greeks in the arts of Design. The Greek writers admit that, when their ancestors were barbarous, the Egyptian colonists of Argos and Athens imported with them the arts of a more polished people ; that they brought into Greece images of the Gods ; and that the most ancient sculptures mentioned by Pausanias and Pliny bore the impress of an Egyptian character ; especially the wooden statues ascribed by Pausanias

to the elder Dædalus and to Attalus, the celebrated colossal statue of the Amyclæan Apollo, and the lions still existing over the gate of Mycenæ.

"In tracing the progress of Grecian sculpture, the author endeavoured to shew that it was possible to divide it into schools and epochs, in a manner similar to that employed by the Italian writers on art to discriminate the different schools of painting, by peculiarities observable in each. From the notices of their sculpture which have reached us, and from existing remains, he conceives that we may distinguish the following great schools of sculpture:

- " 1. The Egypto-Grecian.
- " 2. The Ionian, including the Samian, Chian, and Rhodian.
- " 3. The Sicyonian, including the Corinthian.
- " 4. The Æginetan.
- " 5. The Græco-Italian, comprehending the Hetruscan, Magna-Grecian, and Sicilian.
- " 6. The Attic.
- " 7. The Græco-Egyptian, or period of the Ptolemies.

"In this part of his essay the author briefly sketched the two first schools. The Græco-Egyptian is characterized by severity of style, constrained and little-varied attitudes; with the chief care bestowed on the heads and extremities, while the bodies and draperies are meagre and ungraceful. The Ionian school first began to give more freedom to the attitudes, to separate the limbs, and give energy to the figures. In its later periods it arrived at higher excellence in the most difficult branches of the art, the union of anatomical precision with grace, and noble composition in grouping with the utmost energy of action, as is well seen in *the Venus from the Bath* of the Pontifical collection, and *the Laocoon*; which are later productions of the Ionian school.

"It was this school which introduced into Greece itself the first great improvements on the *Egypto-Grecian* style."

3. Account of Earthquakes felt in Scotland during the Autumn and Winter of 1839. By David Milne, Esq.

"I. The first part of the paper described the number and intensity of the shocks felt between the 3d October 1839 and 13th April 1840, the point (situated near Comrie) from which they emanated, and the distance to which they extended.

"II. The next part of the paper was occupied with an account of the effects, both physical and moral, produced by the shocks.

Under the first class were described the different kinds of injury done to walls, according to their direction, and the nature of the ground on which they were built. Under the second were mentioned the alarm felt by the inhabitants of Strathearn during the great shock of 23d October, as also the quick perception of it by the lower animals, and the terror they evinced at it.

“ III. The nature of the movement of the earth's surface which caused the foregoing effects was next noticed, and data were given illustrating the form of the undulation which was produced. The noises also that accompanied the shocks were fully described, and the probable cause of them stated.

“ Various other concomitant phenomena of an unusual character were noticed, such as the evolution of electricity, the diffusion throughout the atmosphere of something which caused a smell, variously described as ‘ metallic,’ ‘ sulphureous,’ and like the ‘ washings of guns;’ as also the appearance in various parts of Strathearn of a fine black powder, which appeared to consist chiefly of carbonaceous, and partly of siliceous and calcareous matter.

“ IV. The last part of the paper was devoted to remarks on the way in which the undulation ‘ of the earth's’ surface was caused, and the circumstances which may have produced the earthquakes.

“ In reference to the first point, various reasons were assigned why the phenomena were more intelligible, on the supposition that they were caused by vibrations transmitted through the solid crust of the earth, than on the theory supported by many, that they were caused by undulations in the body of molten matter on which the earth's crust may be resting. These vibrations were probably caused by ruptures or explosions at a considerable depth beneath the earth's surface.

“ In regard to the cause of these ruptures, it was observed, that the hills in the immediate neighbourhood of Strathearn are chiefly primitive, and of igneous origin, and that there are numerous greenstone and basaltic dykes, indicating renewed volcanic action at subsequent periods. There are apparently extensive fissures in the earth's crust in this part of Perthshire. It was also observed, that, during the month previous to the occurrence of the earthquake, the atmospheric pressure had been greatly less than usual; and that the quantity of rain which fell was almost unprecedented in the central parts of Scotland. There appeared to be some connection between the state of the atmo-

sphere in both these respects, and the occurrence of the earthquakes, judging from some observations made last autumn, but more particularly from the frequent coincidence of shocks in former years, with a similar state of the atmosphere. Some views were offered as to the influence which these circumstances might have in giving rise to the earthquakes.

“ Notice was taken of shocks which had been felt in other parts of Europe, at the time that shocks occurred in Scotland.”